

the infection reaches the liver through the portal system, and the obstruction to the outflowing bile occurs in and about the lobules and possibly at the beginning biliary passages. This is not to deny the well-known fact that jaundice often arises from obstruction at the common duct or the hepatic duct, and this obstruction may, of course, be inflammatory. Except in the instance of calculi causing actual obstruction at the junction of the cystic and common ducts or in the ampulla, jaundice is probably rather rare from simple angiocholitis of ascending nature.

There are the following outstanding features to the history of the case:

1. The relationship that may exist between hepatitis with necrotic areas, later replaced by interstitial ingrowth on the one hand, and on the other hand persistent gastro-enterocolitis, in some regions intense.
2. With this pathology, nevertheless, there was escape from involvement or inflammation of the chief bile channels and the gall-bladder, as shown during life by operation and later by post-mortem.
3. The illustration of possibly beneficial results from a novel method of treatment, that of transfusion of the normal duodenal content of a healthy donor into the functionless duodenum of a patient, also the value of intestinal perfusion.
4. The remarkable effect in stimulating the flow of bile from a badly diseased liver by direct irrigation of the gall-bladder with a magnesium sulphate solution. This also is, so far as I know, a novel measure of treatment, and is interesting to compare with the method of stimulating the outflow of bile as described by Vincent Lyon.

CALCIFICATION OF THE PITUITARY WITH HYPOPITUITARISM AND WITH SYMPTOMATIC TREATMENT.*

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It has been said by someone that the pituitary is the "gland of personality." To this might be added "It is the gland of romance." Not only has it a great deal to do with physical and mental vigor, the stature, form, color and amount of hair, sex characteristics and physical strength, all being controlled by this bean-sized organ

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tucked away beneath the brain in its own bony casket, but it has to do with romantic things. Without it Leander would not have desired to nor could he have swum the Hellespont to meet Hero. Samson must have had a robust one, so must Goliath, and Delilah's was by no means idle. Physical beauty is entirely dependent upon it, and if this organ is diseased it can make its owner not only hideously ugly, very unhappy, but immoral and even criminal. Several cases of seriously disordered function of this gland with marked calcification of its tissues mostly with hypopituitary symptoms have come to our attention. This is by no means an unknown or undescribed lesion of this organ. In roentgen-ray studies of the skull contents calcareous infiltration has been observed by numerous roentgenologists, in various tissues and structures, notably in tumors, gummatous, cysts, aneurysms, walls of arteries, veins of the velum interpositum, old blood clots, cysticerci, the falk cerebri, the pineal and the pituitary. Detailed studies of the latter have been made by Heuer and Dandy,¹ Murphy,² Timme,³ Pick, Boas and Scholtz,⁴ Pollock⁵ and by Falta.⁶ Some endocrinologists believe that calcification of the pineal gland in youth is its terminal stage. To us it seems that this calcification in the pituitary signifies the same pathological condition. In general works on pathology but meager mention is made of this process, save by Delafield and Prudden, and by James Ewing in *Neoplastic Disease*.

Walter Timme, in a personal communication, related that he saw a pituitary gland at postmortem that exhibited a large granule of calcareous matter in its substance. This gland had been taken from a subject that had suffered for years from hypopituitarism of the Frölich type. He has seen other pituitaries with the same infiltration. Boas and Scholtz, in speaking of calcification of the pineal, describe deposition of brain sand in other (endocrine) glands. They say that deposition of calcium in the pineal is serious. Falta describes marked calcareous infiltration in the sella turcica of a eunuch aged twenty years.

McCarthy and Dercum⁷ reported a case of hypopituitarism in which at autopsy the gland was found to be completely invested with calcareous matter. In one of the illustrations of Heuer and Dandy's most excellent article the shadow of the pituitary is very dense, evidently calcified, and the clinoidal processes are much obscured or obliterated. Dr. Charles H. Frazier, in a personal communica-

¹ Roentgenography in the Localization of Brain Tumors, Based upon a Series of One Hundred Cases, Johns Hopkins Hosp. Bull., November, 1916, No. 309, vol. 27.

² Intracranial Calcification, Am. Jour. Roentgenol., February, 1921, p. 77.

³ A New Pluriglandular Compensatory Syndrome, Endocrinology, July-September, 1918.

⁴ Arch. Int. Med., 1918.

⁵ Am. Jour. Oph., August, 1918.

⁶ Ductless Gland Diseases, P. Blakiston's Son & Co., 1916.

⁷ AM. JOUR. MED. SC., 1902.

tion, related that he operated in 1921 upon a blind youth in whom he found a cyst the arc of which was some 40 mm. above the floor of the sella (the growth was hypophyseal). Its walls in a radiograph made by Dr. Henry K. Pancoast were seen to be densely calcified. This case will soon be published. William Duffy⁸ reported the pathological findings of two hypophyseal tumors that contained calcareous granules and crystals, some of which were found previously by Dandy at operation. Erdheim, quoted by Duffy, reported upon two calcified tumors of the hypophysis in which granules of calcareous matter were seen just above the sella in the radiograph. In an adamantinoma of the hypophysis at autopsy, Beck in 1883 found well-calcified teeth. If a radiograph could then have been made these teeth would have been shown. Duffy found uncalcified bone in one of the tumors above alluded to. Heuer and Dandy report in their paper: "Seven certified hypophyseal and two suprasellar tumors, in the roentgenogram of which are definite calcareous shadows. Since tissue removal at operation has in four instances shown calcification histologically we are inclined to consider all the shadows in all the cases to be due to calcification." We too have presumed that all the shadows in our roentgenograms of cases are calcareous. We have no histological evidence to offer. None of our cases came to either autopsy or to operation. Heuer and Dandy's experience seems sufficient data for our tenets, not to mention the other evidence of Duffy, Timme, etc., that we have produced. All that we have in the way of histories in seven of our cases consists of some notes and the radiographs, the subjects being too crippled to come from a distance for further study.

Timme describes an entirely new pluriglandular syndrome (Timme's Syndrome) in which the major element is pituitary disease, mainly under-secretion. In several of the excellent plates which illustrate his article moderately dense shadows are to be seen in the pituitary fossa, with smallness of the fossa and a bridging over of the cavities by the clinoidal processes. In some of our cases this same appearance is shown. This latter, according to Timme, crowds in the pituitary and has a great deal to do with the symptomatology of the syndrome. This can be plainly seen in the illustrations which accompany Timme's article, and in Fig. 1 of our cases the confinement of the gland may lead to ultimate calcification. The role of infection of the sphenoid lying below and adjacent to the sella is probably important. In Case I, reported below in detail, early sinusitis was probably the cause of an inflammation of the pituitary with ultimate calcification of it and its enveloping capsule. In most of the cases of calcification a condition of hypopituitarism accompanies the infiltration, but not always. Hyperplasias with hyper-

pituitarism (Timme's stage of compensation) exhibit this degenerative change. Indeed, every variety of dyspituitarism may show this form of infiltration. It may mean but a single manifestation of a pluriglandular sclerosis due to some infection. What pathological process precedes it we are at a loss to say. At any rate it can mean nothing but a final step in a degenerative change.

CASE I (Fig. 1).—This corresponds in many ways to a mild partly compensated form of Timme's syndrome, to which the reader is referred. Mr. X, aged fifty-four years, had long before coming under our observation been considered by his various physicians to be a confirmed



FIG. 1.—Case I, aged fifty-four years. Normal sella. Note the smooth outline of the bony walls, the solidity of the clinoid processes, the clear sphenoidal sinus below and the uniform density both within the sella and outside. Incidentally the arrow points toward a calcification of the pineal gland.

neurasthenic. He had been born of healthy parents, in excellent circumstances and tenderly reared in affluence and culture. His family history in some respects was far from robust nervously. A brother died in youth of dementia precox. An uncle died insane. His parents were too solicitous as to his health and kept him too much indoors lest he should catch cold, which he nevertheless often did in his childhood and youth. He entered college at eighteen years and was promptly dubbed "Sleepy" by his classmates because of his somnolent tendencies (a certain sign of insufficient pituitary function.) Headaches began then and afflicted him for many years; these were mostly occipital. He never had syphilis, typhoid or tuberculosis. He was educated as a clergyman and led an exemplary

life. He is the father of six children, five of whom are living, four being ruddy, healthy youths. One shows signs of early fatigue and some depression at eighteen years, due to too rapid growth. After completing his college course he suffered a nervous breakdown, for which he went to Europe and finally recovered. Again in the late forties he suffered another breakdown lasting two years, from which he again recovered. Symptoms of vagotonia afflicted him in these breakdowns. This expressed itself as a gastric neurosis which at times was so severe as to suggest to his attendants that he had an ulcer of the stomach. Vagotonia, according to Timme, is common in these cases. For thirty years he was miserable because of headaches, early fatigue and depression. He never engaged in any active pursuit, save for a time he was a gentleman

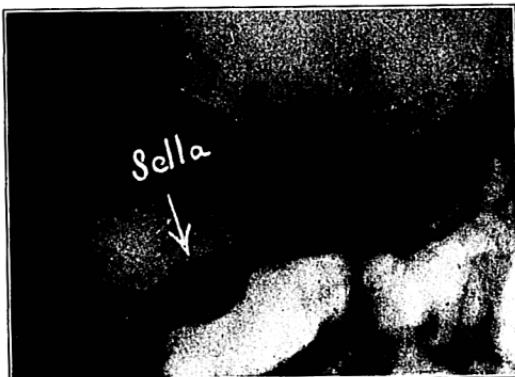


FIG. 2.—Case I, showing calcification in the pituitary region and confined to the pituitary region, occurring in an adult who showed relief of his clinical symptoms after the administration of pituitary extract.

farmer. He lived mostly in his library, being a student and author. Examination, in 1920, revealed a slender, graceful man weighing 140 pounds, 5 feet 8 inches in height. This weight never varied for many years. He exhibited no morphological abnormalities save that his hands were well shaped, fingers were long, thin and slenderly graceful; hair abundant; skin smooth and satiny. His finger nails exhibited none of the crescents at the base of the nails, an uncertain sign of pituitary dysfunction. His head was square, large, brachycephalic, index 82. At this time he suffered from nervous belching after food, rhinorrhea from the right nostril, depression, exhaustion and insomnia, all indications of a depressed pituitary function. There were no bladder symptoms, no polyuria or polydipsia. His heart and lungs were normal in every way; liver and spleen of

natural size; chest and abdomen well formed. There was no hint of Glenard's syndrome. There was slight arteriosclerosis. Blood-pressure was very low, being 110 systolic and 70 diastolic. A very significant sign of pituitary dysfunction was the fluctuating blood-pressure. It varied very much while being taken. It was indeed hard to obtain a constant reading. Nothing was found wrong with the nervous system save the vagotonia and neurasthenia above noted. Examination of his eyes by Dr. J. T. Carpenter revealed nothing abnormal in any way. Upon the supposition that he was suffering from pituitary hypofunction, his sugar tolerance was tested and found high; 300 gm. of glucose ingested caused no sugar to appear in the urine. Otherwise the urine was found to be normal. He was put upon 2 grains of the whole extract of pituitary three times a day. This at once began to act as a most beneficent hormone. Euphoria supplanted fatigue symptoms and depression, a condition that he had not known for years. His blood-pressure was not raised, so the change in his mental condition was not caused by this effect. His insomnia at once left him. He slept for hours during the day, and so soundly at night that he feared some sort of coma which alarmed him. Partial insomnia with excitability of mind followed this. His mental tone increased. He was able to work longer at his literary labors. Nervous depression disappeared, but as yet there was no increase in blood-pressure. The dose of the extract was then cut to 1 grain and the improvement continued. The drug "stimulated everything," to use the patient's expression.

The roentgen-ray examination of the skull at this time revealed normal sinuses, a small shallow sella turcica with the anterior clinoidals obscured and the fossa almost completely closed by either a prolonged clinoidal process or else by what might be called an operculum. To this restricted condition of the pituitary Timme ascribes the headaches that torment the victims of some forms of pituitary disease. Throughout, the gland shows a granular and cloudy condition in the radiographs, evidently due to deposits of calcareous matter. This latter infiltration being more intense in the posterior portion, the sugar tolerance being high and the vaso-motor tone being low, the use of the whole gland extract was abandoned and $\frac{1}{16}$ grain of the posterior extract was given, with excellent results. Later 1 grain of the anterior portion was added. After six months the weight had increased from 140 to 156 pounds, the constipation which he had had for many years disappeared and the blood-pressure rose from 110 to 138, but the varied readings noted during the observation still indicated some vaso-motor imbalance. In this case Sergeant's white line was not elicited. The arrangement of the pubic hair is normal for a male. He is compelled still to take his pituitary extracts. Later when fatigue symptoms increased, $\frac{1}{16}$ grain doses of thyroid extract were added to his other medicines with marked benefit. Iodides were too found beneficial.

Remarks. The frequent colds to which the patient was subject when a child may have caused a sphenoiditis. By continuity the inflammation may have spread by way of the sella turcica to the pituitary, giving rise to an inflammation therein. The ablation of the clinoids is significant of an inflammatory process. The sphenoid today is healthy. Timme has seen gross evidence of involvement of the pituitary fossa by sphenoid disease. He holds that the discharge comes from Rathke's pouch in the pituitary. The fatigue, depression, vagotonia, headache, lethargy, high sugar tolerance, low pressure, vasomotor instability, rhinorrhea, belching, absence of nail crescents, together with the radiograph showing the shallow sella turcica with clouding and granulation of the pituitary, constituted a syndrome that can be none other than hypopituitarism with calcareous infiltration. The gland extract feeding results confirm the dyspituitarism at least. This case suggested the review of other cases in our collection.

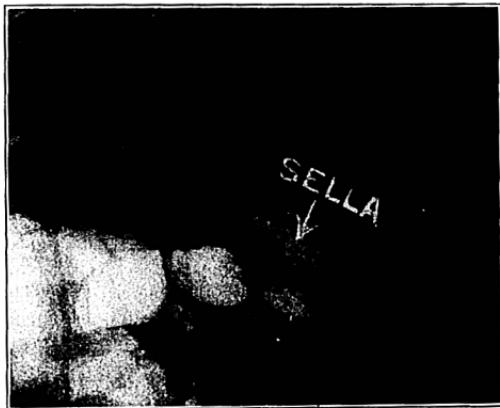


FIG. 3.—Case II, aged thirty-eight years. A case of hereditary optic atrophy previously reported by Zentmayer showing some evidence of calcification of the pituitary associated with enlargement of the sella and presenting evidence of mental deficiency. No improvement under pituitary feeding.

CASE II (Fig. 3).—Joseph C., aged thirty-eight years, a molder by trade, was sent to Dr. Pfahler for roentgen-ray study by Dr. Thorington in May, 1913. The patient then was nearly blind. He could find his way about and could just distinguish light from dark. He made a living by picking up waste paper in his town. When seen again by us eight years after, in 1921, an examination showed a small muscular man with the skull and facies of a moron. He presented none of the morphological changes of pituitary dys-

function. He was not neurasthenic. His family history is important in one respect in that his younger brother exhibited the same symptoms in a lesser degree. The history of both appeared in a paper by Dr. Zentmayer. Both were victims of Leber's disease (hereditary optic atrophy). The brother, Charles, died in 1918 of influenza. Other than this there was no history of blindness or mental deficiency in the family. He is married and has one child, which is healthy and strong. His previous medical history is unimportant. He never had syphilis but had suffered from quinsy and whooping-cough. He was hit on the head by a chain two years before he began to go blind. In 1912 he became partly blind in one eye. The first symptoms were visual disturbances like falling snow before his eyes, giving way later to fog. Six months later the other eye became affected. About this time he had a severe pain in his head which was hard to endure. Physical examination at this time revealed to us a rather small man of thirty-nine years weighing 133 pounds. All his thoracic and abdominal organs were normal in every way. His blood-pressure (recumbent) was 92 systolic and 65 diastolic. Sexual organs were normal in form, function, etc. Pubic hair was abundant and normal in distribution, and not feminine (which characterizes the pubic hair in male pituitary cases). His knee-jerks were prompt, his station normal, the pupils were large and reacted to light sluggishly. His speech was hesitating; his lips trembled before he spoke. His ideas were primitive. He had the mental status of a child of ten years. His skull was small, measuring 18.5 x 15 cm. index 81. He had short spade-like hands with stumpy fingers. His appetite was normal. He did not crave carbohydrates abnormally; had no flatulency; slept well but had nocturnal polyuria, and was not easily fatigued. His vasomotor tone was fair. The urine was normal save for a low specific gravity. He exhibited a high tolerance for sugar (250 gm. of glucose ingested did not cause glycosuria). He did not exhibit Sergent's white line of adrenal insufficiency; the thyroid was not palpable; the skin was smooth; chest very hairy (hypertrichosis). Eye examination by Dr. Zentmayer in November, 1917, showed vision: right eye, $\frac{1}{10}$; left eye, $\frac{1}{10}$; never any diplopia; absolute central scotoma 20 degrees in both eyes. Optic nerves then were greenish-gray and the vessels were contracted. In examination in 1921 he says that he saw red at times but not blue. Cushing says that color perception in these cases disappears before form perception. A roentgen-ray study by Pancoast, in 1912, then showed a sella turcica 13 mm. long x 12 mm. deep (a fairly large sella). The radiograph by Pfahler made in 1913 showed also some calcification of the pituitary, which had increased perceptably when reexamined January 21, 1921, at which time the sella measured 14 mm. x 12 mm. That this man had hypopituitarism is shown by the high sugar tolerance and the low

blood-pressure in spite of an enlarged pituitary. Pituitary feeding (whole gland) in doses of 6 grams *per diem* caused no improvement in his condition. Thyroid added to this after three months also was followed by no improvement. The blood-sugar content was not estimated. Cushing's thermic reaction was negative. An examination of the sella turcica of a brother, Charles C., by Pancoast, in 1911, showed a trifling enlargement of the sella. Viewing the radiograph Pfahler is inclined to think that his pituitary also shows increased opacity, presumably due to calcareous deposit. In this case the pituitary enlarged to compensate for other endocrine default.

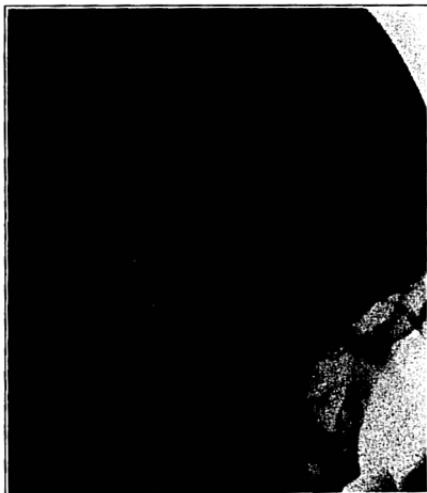


FIG. 4.—Case III, aged twenty-seven years, showing calcification in the sella with decrease in the size of the sella. Patient suffered from seven years from vertigo and vomiting.

CASE III (Fig. 4).—Miss E. F., aged twenty-seven years, referred to Dr. Pfahler for examination November 14, 1917, by Dr. William Menah. She had suffered from attacks of vertigo for seven years. Dr. Menah had treated the right ear for deafness. She also suffered from vomiting and the vomiting was associated with attacks of vertigo. The roentgen-ray examination of the head showed some calcification in the region of the pituitary. The anterior and posterior clinoid processes apparently met. The sella was abnormally small. In addition to this there was abnormal enlargement of the veins in the right parietal region. Enlargement of the veins

is at times associated with brain tumors in the region of this enlargement. Attempt has been made to trace this patient, but without success.

CASE IV (Fig. 5).—Miss M. S. M., aged nineteen years, was referred to Dr. Pfahler for examination of the head December 10, 1913, by Dr. Ralph Spangler. The patient had epilepsy since ten years of age. Menstruation began at thirteen. She had had five attacks of *status epilepticus*. Just previous to the examination she had gone through sixty attacks of epilepsy in nine days. Roentgen-ray examination of the sella turcica showed it to be about one-third normal size. The pituitary region seemed to be almost completely calcified. She died about six months later in *status epilepticus*. No autopsy was performed and none of the studies were made that we now make with reference to the pituitary.

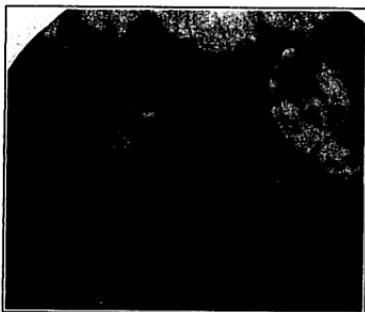


FIG. 5.—Case IV, aged nineteen years. Patient suffered from epilepsy since ten years of age. Had several attacks of *status epilepticus* and died in this condition.

CASE V (Fig. 6).—Mr. R. D., aged twenty-two years, was referred to Dr. Pfahler May 7, 1914, by Dr. William E. Robertson for an examination of the skull, with special reference to the sella turcica. Dr. Robertson considered this case a typical Froelich type of hypopituitarism. He weighed 237 pounds, was about 5 feet 8 inches in height and had no pubic hair. The roentgen-ray examination showed calcification of the pituitary region with a very indefinite outline of the anterior and posterior border of the sella because of this calcification. It seemed, however, to be abnormally small. This patient was later referred to a sanitarium and died about four years ago. It would seem that with the definite diagnosis made by Dr. Robertson that these roentgen-ray findings would correspond very closely to that of hypopituitarism.

CASE VI (Fig. 7).—Mr. S. Y., aged forty-four years, referred to Dr. Pfahler by Dr. L. Webster Fox for roentgen-ray examination of the head on May 10, 1913, with a provisional diagnosis of tumor



FIG. 6.—Case V, aged twenty-two years, showing calcification which is almost complete of the pituitary in a case of the Froelich type of hypopituitarism.



FIG. 7.—Case VI, aged forty-four years, showing almost complete calcification of the pituitary which is as dense as any part of the neighboring bone. Patient had double optic neuritis.

of the brain. Ophthalmological examination by Dr. Fox showed optic neuritis. Blood-pressure May 10, 1913: systolic, 165; diastolic, 132. Blood examination showed red corpuscles, 4,980,000; hemoglobin, 90 per cent; leukocytes, 10,000. Urinalysis negative. Roentgen-ray examination of the head showed an abnormal capacity in the sella turcica, evidently due to calcareous infiltration. The sella itself measured 12 mm. in the antero-posterior diameter and 10 mm. in the vertical. The floor of the sella was preserved. The anterior and posterior clinoid processes were obscured by the dense shadow in the pituitary region. The sphenoid sinus was clear. A communication from Dr. Fox June 1, 1921, is as follows: "Gradual loss of vision for the last six months (date of visit May 15, 1913), commencing in the right eye and extending to the left. Ophthalmoscope shows double optic neuritis, 5 to 8 diopters in height. Advised physician to give large and increasing doses of potassium iodide. May 25, 1913 he wrote me a letter stating that there was improvement in his condition. He could see more plainly. Have heard nothing since that date."



FIG. 8.—Case VII, aged twenty-six years, with the clinical symptoms of neurasthenia present. Calcified body located about 1 cm. above the sella turcica similar in appearance to the case reported by Duffy.

CASE VII (Fig. 8).—Mrs. A. H., aged twenty-six years, was referred to Dr. Pfahler for roentgen-ray study February 29, 1919, by Dr. Samuel Sica. Briefly her history referable to the conditions

in her head consisted in a statement that during three years she had had severe pains in the back of the neck and top of the head. Examination of the eyes by Dr. Zentmayer was reported negative. Two neurologists made a diagnosis of neurasthenia. An examination of the teeth resulted in the removal of a bridge and one tooth, but was not followed by any relief. The tonsils were removed but gave no relief. Headache was constant but worse at the menstrual period. Did not menstruate excessively. Headaches improved after the menstruation had started. An examination of the head showed especially obliteration of the diploë in the parietal region where the bone was very thick. In addition to this there was found a similar dense body, undoubtedly of calcareous

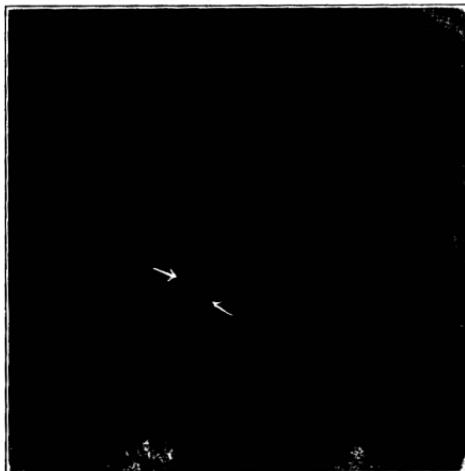


FIG. 9.—Case VII, showing the posterior-anterior view of this calcified body.

material, about the size of a pea, located just above the right side of the sella turcica, evidently in the region of the infundibulum. This location corresponds to the location of the calcareous material shown in the case reported by Dr. Duffy, previously referred to. Up to the present time there has been neither operation nor autopsy, and the exact nature of this case has not been determined.

CASE VIII.—Mrs. M. T., aged forty-six years, was referred to Dr. Pfahler for roentgen-ray study on February 11, 1916, by Dr. A. C. Morgan. The chief complaint was neuralgia affecting the left side of the head and the left side of the body, including the arm. At times there were also pains in the right shoulder and arm.

Removal of infected teeth had no affect on these pains. Roentgen-ray examination showed the accessory sinuses normal. The teeth were normal and examination of the cranium showed a calcareous deposit about the pituitary region with destruction of the anterior and posterior clinoid processes, and then above and posterior to this a marked decrease in the density. In addition to this there was an increased area of density over the Rolandic region on the left side covering an area about two inches in diameter. An attempt has been made to obtain the subsequent history in this case, but so far without success.



FIG. 10.—Case VIII, aged forty-eight years, showing calcification in the sella probably result of tumor formation.

CASE IX.—Mr. L. D., aged fifty-one years, a large man of normal configuration, weighing over 190 pounds, came to our attention in 1921 complaining of early fatigue and some psychasthenia. In 1912 and 1917 he broke down nervously and relinquished work for a time. His family history was not good, his parents both being nervous and his sisters likewise were afflicted. One sister had Graves's disease; his mother died of diabetes and the father of cancer. In childhood he contracted typhoid and had the milder childhood diseases. In early manhood he contracted diphtheria. He never had syphilis. Wassermann was negative on two occasions. Physical examination revealed nothing of importance. All of his organs were normal in function. A slight mitral murmur was heard at the apex of the heart, which was otherwise normal. Its rhythm was normal, although at times he experienced extra-

systoles and it was not enlarged. There was no dyspnea. (Earlier in life he was rather athletic.) Urine and blood were normal. There were no morphological abnormalities or skin changes suggesting pituitary dysfunction. Sergent's white line was not discernible; thyroid not palpable; skin smooth; blood-pressure, 140; systolic reflexes prompt; station good; pupils normal. His head measured 21 cm. x 16½; index, 81. He has a moderate arteriosclerosis. Some tortuosity of the vessels in the retina were reported, but no other eye changes. A roentgen-ray study of his skull revealed an interesting condition. The sinuses were normal. The sella turcica was shallow, measuring 10 mm. in length by 7 mm. in depth. The pituitary was completely invested by a capsule. In order for the capsule to be demonstrable in the roentgenogram it must contain lime salts. There was no evidence of calcareous involvement of



FIG. 11.—Case IX, aged 51 years, showing calcification of the capsule extending across the top of the pituitary area in a patient who had suffered from symptoms of neurasthenia, which was relieved by the administration of pituitary extract.

the gland itself. While there was no definite evidence of pituitary disease the vagotonia and neurasthenia improved under pituitary feeding. The enveloping capsule, which is demonstrated in the roentgenogram, is the only one of our series exhibiting this condition. Dr. Pfahler is of the opinion that the pituitary in this man is too small, being as noted rather shallow. His head is broad, however, and the interpupillary space much larger than normal. It is probable that the pituitary gland is wider than normal, making up for the deficiency in depth.

Remarks on the Roentgenologic Findings. Roentgenologists have been giving more and more attention to the size and shape of the sella turcica and to the clinoid processes in their relation to pituitary disease. It seems that we must now go a step further and pay close attention to the density of this area as compared

with the immediate surrounding brain structure. If the pituitary is not calcareous there should be no difference in the density of this area within the sella turcica from that of the surrounding brain tissue. Calcareous deposits within this area will indicate a diminution in the total value of the pituitary just as much as if the area were compressed by a small sella. Besides this we believe such infiltration is a definite indication of disease either present or past within the gland, though some studies suggested by this paper, now being carried on by Pfahler, would seem to indicate that calcareous deposits may be present or at least the gland may be more dense in patients who have no definite symptoms. It is always advisable to make stereoscopic studies of the sella before making a diagnosis.

Calcareous deposit is recognizable in the cases which we are reporting. In all but one of them there were definite clinical symptoms pointing toward pituitary disease. In one of these cases, also previously studied by Drs. Pancoast⁹ and Zentmayer,¹⁰ there was no calcareous deposit reported in the examination made a year previously, but a study of the illustrations in two different publications would seem to indicate that this area is more dense than that shown in the other illustrations, and we would assume that there were some abnormal calcareous deposits at that time, though it had undoubtedly increased within the year. In addition to this, Pancoast has referred to Pollock's paper,¹¹ in which there was reported another case of hereditary optic atrophy in which there was found a shadow about the size of a very small bean with a concavity downward and situated in and a little below the center of the pituitary fossa. Presumably this was calcareous deposit. In addition to these 9 cases of calcification in the region of the pituitary reported by us, and in which there was associated more or less evidence of hypopituitarism, Dr. Pfahler has in his collection 4 cases, the histories of which are not included in this paper, and in which there is line deposit in the pituitary area, though the patients are suffering from acromegaly.

The observations made in this paper have suggested to Dr. Pfahler the importance of studying the normal sella turcica, and to this end he has made, up to the present time, 75 such studies in patients who had no evident pituitary symptoms. In this number there has been demonstrated some evidence of calcification in 4 cases, or 5.4 per cent. We believe that it is possible for the other endocrine glands to compensate in part, for a time at least, for the defective function of this gland, and this might explain the absence of symptoms at present which in later years may become

⁹ Pancoast: *Am. Jour. Roentgenol.*, January, 1910, No. 1, 6.

¹⁰ Zentmayer: *Concerning the Etiology of Hereditary Optic Atrophy*, Report of Two Cases, *Arch. Oph.*, 1918, No. 10, 47.

¹¹ *Loc. cit.*

manifest, for it is well known that pituitary changes are often very slow. Even with normal-sized sella turcica and normal clinoid processes, calcareous infiltration in this gland might account for diminished endocrine function. Even if no symptoms are present any such finding should raise the suspicion of dysfunction and the patient should be kept under observation at intervals over a long period of time for any calcification developing in soft tissues is evidence of tissue death. At times such deposit may indicate the formation of a neoplasm.

ACTINOMYCOSIS OF THE TONGUE.

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ROCHESTER, MINN.

ACTINOMYCOSIS is common among cattle and hogs. It occurs quite frequently in man, although often it is not recognized, especially around the head and neck. One hundred and twenty-seven patients with actinomycosis were examined in the Mayo Clinic from January 1, 1910, to January 1, 1921. In 66 the disease occurred in the head and neck; in only 3 did it occur primarily in the tongue.

In 1826, Leblanc gave a careful description of a disease affecting the jaws of cattle which he called "osteosarcoma." In 1845 von Langenbeck first noticed the characteristic yellow granules in a case of caries of the spine in man. Bollinger (1877), however, very largely deserves the credit for the recognition of the disease as a pathological entity. He first ascribed the peculiar enlargement of the jaws of cattle, popularly known as "lumpy jaw," to the organism that Harz had just named the "ray fungus," or "actinomyces." Israel, in 1878, recognized the organism as the cause of the disease in man. Since that time much has been written on the subject and descriptions of this condition in practically every organ and tissue of the body have been recorded.

Actinomycosis rarely occurs primarily in the tongue. It may occur in this location by metastasis or by direct extension from involved contiguous structures. Illich, in 1892, found only 15 in 569 cases in which the growth originated in the tongue. Ruhrah, in 1899, collected 1094 cases of actinomycosis from the literature. Krymow, ten years later, was able to find only 27 cases in which the tongue was primarily involved. Von Baracz reported 3 of this